

1 CLAIMS

2
3 1. Apparatus comprising:

4
5 a header having a surface defining a substantially
6 horizontal plane; and

7
8 a chip-level optical transceiver carried by a bench
9 disposed in a tilted state for aligning the chip-level
10 optical transceiver with an optical fiber.

11
12 2. Apparatus of claim 1, further comprising an optical
13 fiber aligned with the chip-level optical transceiver.

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15 3. Apparatus of claim 2, further comprising a package
16 securing and containing the optical fiber, the bench, and the
17 chip-level optical transceiver carried by the bench.

18
19 4. Apparatus of claim 3, wherein the package comprises:

20
21 a support structure securing the fiber;

22
23 a header coupled to the support structure; and

1 the bench carried by the header in front of the
2 optical fiber.

3

4 5. Apparatus of claim 4, wherein the package
5 hermetically seals the bench and the chip-level optical
6 transceiver carried thereby.

7

8 6. Apparatus of claim 5, wherein the chip-level optical
9 transceiver comprises:

10

11 a light emitting device, having an output, for
12 emitting a first wavelength of light along a first
13 optical path;

14

15 a first photodiode for controlling the output of the
16 light emitting device;

17

18 a second photodiode having an active region;

19

20 a lens for receiving the first wavelength of light
21 along the first optical path from the light emitting
22 device and collimating the first wavelength of light to
23 the second photodiode along the first optical path; and

1 the second photodiode for reflecting the first
2 wavelength of light along the first optical path into the
3 optical fiber along a second optical path.

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5 7. Apparatus of claim 6, further comprising:

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7 the optical fiber for transmitting a second
8 wavelength of light to the second photodiode along the
9 second optical path; and

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11 the second photodiode adapted and arranged to permit
12 the second wavelength of light to pass therethrough to
13 the active region thereof for conversion into an
14 electrical signal.

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16 8. Apparatus of claim 7, wherein the first wavelength
17 of light is different from the second wavelength of light.

1 9. In an optical fiber and a header mounted adjacent
2 the optical fiber, apparatus therein comprising a chip-level
3 optical transceiver supported by a bench carried by the header
4 in a tilted state aligning the chip-level optical transceiver
5 components with the optical fiber.

6

7 10. Apparatus of claim 9, further comprising a package
8 securing and containing the optical fiber, the bench, and the
9 chip-level optical transceiver carried by the bench.

10

11 11. Apparatus of claim 10, wherein the package
12 comprises:

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14 a support structure securing the fiber;

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16 a header coupled to the support structure; and

17

18 the bench carried by the header in front of the
19 optical fiber.

20

21 12. Apparatus of claim 11, wherein the package
22 hermetically seals the bench and the chip-level optical
23 transceiver carried thereby.

1 13. Apparatus of claim 12, wherein the chip-level
2 optical transceiver comprises:

3

4 a light emitting device, having an output, for
5 emitting a first wavelength of light along a first
6 optical path;

7

8 a first photodiode for controlling the output of the
9 light emitting device;

10

11 a second photodiode having an active region;

12

13 a lens for receiving the first wavelength of light
14 along the first optical path from the light emitting
15 device and collimating the first wavelength of light to
16 the second photodiode along the first optical path; and

17

18 the second photodiode for reflecting the first
19 wavelength of light along the first optical path into the
20 optical fiber along a second optical path.

1 14. Apparatus of claim 13, further comprising:

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3 the optical fiber for transmitting a second
4 wavelength of light to the second photodiode along the
5 second optical path; and

6

7 the second photodiode adapted and arranged to permit
8 the second wavelength of light to pass therethrough to
9 the active region thereof for conversion into an
10 electrical signal.

11

12 15. Apparatus of claim 14, wherein the first wavelength
13 of light is different from the second wavelength of light.

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15 16. Apparatus of claim 14, wherein the first optical
16 path is coincident to the second optical path.

1 17. A method comprising steps of:
2
3 providing an optical fiber;
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5 providing a bench that supports a chip-level optical
6 transceiver;
7
8 placing the bench in front of the optical fiber;
9
10 activating the chip-level optical transceiver; and
11
12 tilting the bench until the chip-level optical
13 transceiver is aligned with the optical fiber and an
14 optical signal is achieved.
15
16 18. The method of claim 17, further comprising mounting
17 the optical fiber, the bench, and the chip-level optical
18 transceiver carried by the bench in a package.

1 19. The method of claim 18, the package comprising:
2
3 a support structure securing the fiber;
4
5 a header coupled to the support structure; and
6
7 the bench carried by the header in front of the
8 optical fiber.

9
10 20. The method of claim 17, wherein the chip-level
11 optical transceiver comprises:

12
13 a light emitting device, having an output, for
14 emitting a first wavelength of light along a first
15 optical path;

16
17 a first photodiode for controlling the output of the
18 light emitting device;

19
20 a second photodiode having an active region;

21
22 a lens for receiving the first wavelength of light
23 along the first optical path from the light emitting

1 device and collimating the first wavelength of light to
2 the second photodiode along the first optical path; and
3
4 the second photodiode for reflecting the first
5 wavelength of light along the first optical path into the
6 optical fiber along a second optical path.